

8.22 ST. MARY'S COUNTY

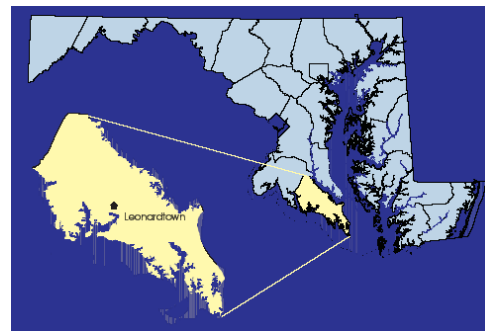
This chapter presents information about stream conditions of potential management interest in St. Mary's County based on the 2000-2004 Maryland Biological Stream Survey (MBSS) results. Information from MBSS data collected between 1994 and 1997 can be found in MDNR 2001t.

8.22.1 Ecological Health

Based on the three ecological health indicators used by the MBSS, the overall condition of St. Mary's County streams during 2000-2004 was Fair (Figure 8-177). The FIBI results indicate that 17% of the streams in the county were in Good condition, and 54% rated Good using the BIBI. In contrast, 33% of the streams in the county scored as Poor or Very Poor using the CBI, while 31% scored as Good and 39% scored as Fair. It should be noted that 16% of stream miles were not rated for fish (FIBI) because those miles met the criteria for blackwater streams or because they were dry and not sampleable for fish. There are no remaining blackwater streams in Maryland healthy enough to serve as reference sites for IBI development, so blackwater streams in the county were not rated for fish.

Sites with high IBI scores were scattered around the county, but concentrations were evident in the St. Mary's River watershed and in the northwestern part of the county. The highest rated streams in St. Mary's County using the Combined Biotic Index (CBI) were Jarboesville Run, Johns Creek, and Chaptico Creek (Table 8-43). In contrast, the lowest rated streams included unnamed tributaries to Whites Neck Creek, St. George Creek, and the St. Mary's River. Based on Stream Waders data, sites rated as Poor or Very Poor for benthic macroinvertebrates in the county were outnumbered by sites rated Good or Fair (Table 8-44).

One MBSS Sentinel site was located in St. Mary's County, an unnamed tributary to St. Clements Creek. Sentinel sites were chosen to provide a representation of the best remaining streams around the state and track natural variations in stream health. Where possible, Sentinel sites are located in watersheds with as much protected land as possible, or in areas projected to become degraded from development at a slower pace. More information about the MBSS Sentinel stream network is found in: 2000-2004 Maryland Biological Stream Survey Volume 11: Sentinel Sites (http://www/dnr/Maryland.gov/streams/pubs/ea05-8_sentinel.pdf).



8.22.2 Physical Habitat

8.22.2.1 Overall Condition

Based on the Physical Habitat Index (PHI), nearly 20% of the streams in St. Mary's County had Minimally Degraded habitat, 59% had Partially Degraded habitat, and 22% had either Degraded or Severely Degraded habitat (Figure 8-178). Sites rated as Minimally Degraded for physical habitat were concentrated in the St. Mary's River watershed. In contrast, Severely Degraded and Degraded sites were primarily in the northwestern section of the county.

8.22.2.2 Trash

Over 65% of the stream miles in St. Mary's County were rated Optimal for trash (Figure 8-179). In contrast, 10% of streams were rated as Marginal or Poor for trash. Sites with little or no trash were common throughout the county. However, elevated levels of trash were mostly found in the areas around Lexington Park and Leonardtown.

8.22.2.3 Channelization

About 4% of the stream miles in St. Mary's County were channelized (Table 8-4). The type of channelization found at MBSS sites was earthen ditches (Figure 8-180). The only channelized sites occurred in the western portion of the county.

8.22.2.4 Inadequate Riparian Buffer

About 1% of the stream miles in St. Mary's County had no riparian buffers during the 2000-2004 MBSS (Table

8-3). In addition, 6% of stream miles had severe breaks in existing riparian buffers (Figure 8-181). No geographic trend in the distribution of buffer breaks or unbuffered areas was evident. Additional information about buffer breaks, analyzed by county, is provided in: 2000-2004 Maryland Biological Stream Survey Volume 10: Riparian Zone Conditions (http://www/dnr/Maryland.gov/streams/pubs/ea05-7_riparian.pdf).

8.22.2.5 Eroded Banks/Bedload Movement

About 36% of the stream miles in St. Mary's County were rated as having minimal (Optimal) bank erosion (Figure 8-182). In contrast, 11% of stream miles were rated Poor for bank erosion and an additional 23% were rated Marginal. Bank erosion was a common problem in the northwestern portion of the county.

Nearly one half of the stream miles in St. Mary's County had moderate or extensive bar development (Figure 8-182). An additional 37% of streams had minor bar development, and 12% of the stream miles were devoid of bars. There was no discernable pattern in bar formation in county streams.

8.22.3 Key Nutrients

8.22.3.1 Nitrate-Nitrogen

Nearly 76% of the stream miles in St. Mary's County had nitrate-nitrogen levels comparable with forested Maryland

streams (Figure 8-183). The remaining 24% of stream miles had levels elevated above background, but no stream had a value greater than 5 mg/l, the level at which biological impacts have been documented. In general, nitrate-nitrogen levels were higher in the northern part of the county.

8.22.3.2 Total Phosphorus

Although the majority of stream miles in St. Mary's County had total phosphorus levels within the range for forested Maryland streams, 43% had elevated levels. Of these, 10% had total phosphorus above the level at which biological effects may occur. As with nitrate-nitrogen, total phosphorus levels were higher in the northern part of the county (Figure 8-184).

8.22.4 Stream and River Biodiversity

To provide a means to prioritize stream systems for biodiversity protection and restoration within each county and on a statewide basis, a tiered watershed and stream reach prioritization method was developed. Special emphasis was placed on state-listed species, stronghold watersheds for state-listed species, and stream reaches with one or more state-listed aquatic fauna. Fauna considered included stream salamanders, freshwater fishes, and freshwater mussels. Rare, pollution-sensitive benthic macroinvertebrates collected during the 1994-2004 MBSS were also used to identify the suite of watersheds necessary to conserve the full array of known stream and river biota in Maryland. A complete description of the biodiversity ranking process is found in: 2000-2004 Maryland Biological Stream Survey Volume 9: Stream and Riverine Biodiversity (http://www/dnr/Maryland.gov/streams/pubs/ea05-6_biodiv.pdf).

Of the four watersheds found in St. Mary's County, Breton Bay/St. Clements Bay and Wicomico River were classified as Tier 1, meaning that these watersheds serve as strongholds for one or more state listed aquatic species (Figure 8-185). In contrast, the Patuxent River Lower watershed was among the lowest ranking for stream and river biodiversity in the state (78th of 84). Any reaches that had either state-listed or GCN species, or high intactness values were highlighted to facilitate additional emphasis in planning restoration and protection activities.

8.22.5 Stressors

At 80% of stream miles, the most extensive stressor characterized by the MBSS in St. Mary's County during the 2000-2004 MBSS was non-

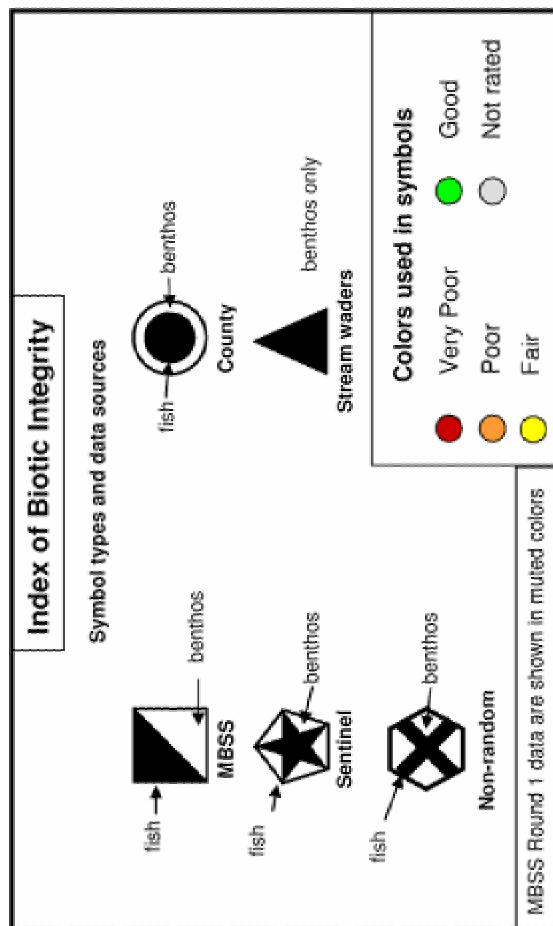
AN IMPORTANT NOTE ON BIODIVERSITY MANAGEMENT

Perhaps the largest ongoing natural resources restoration and protection effort in Maryland is associated with the Chesapeake Bay. In most cases, freshwater biodiversity is not specifically considered during placement and prioritization of Bay restoration and protection projects. In this report and in the more detailed volume in the series on aquatic biodiversity, a system of biodiversity ranking is presented to provide counties and other stewards with a means to plan appropriate protection and restoration activities in locations where they would most benefit stream and river species. Given the historically low level of funding for biodiversity protection and restoration in Maryland and elsewhere, the potential benefit of incorporating freshwater biodiversity needs into other efforts is quite large.

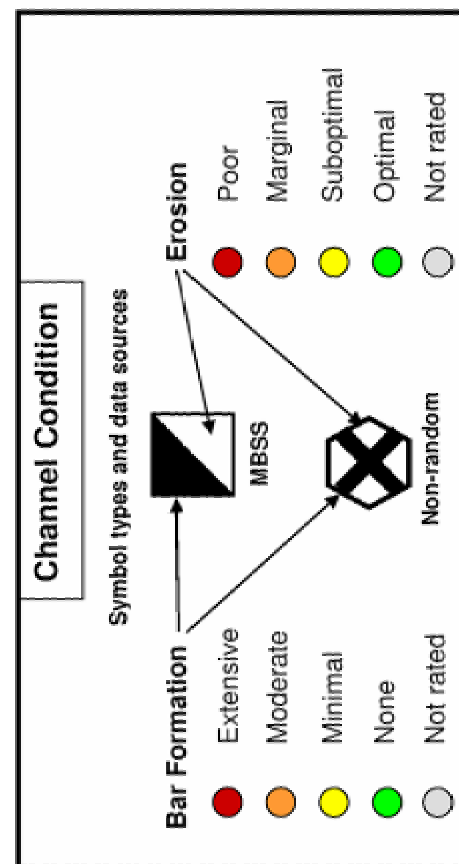
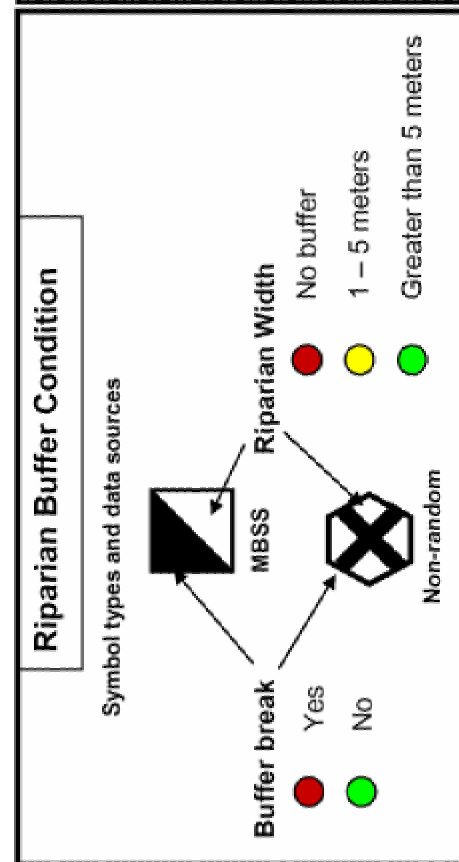
However, it is important to note that although freshwater taxa are the most imperiled group of organisms in Maryland, other groups and individual species not typically found in freshwater habitats are also at high risk and constitute high priority targets for conservation. In addition, freshwater taxa that prefer habitats such as small wetlands may not be well-characterized by the ranking system employed here. To conserve the full array of Maryland's flora and fauna, it is clearly necessary to use other, landscape-based tools and consider factors such as maintaining or reconnecting terrestrial travel corridors.

native terrestrial plants in the riparian zone (Figure 8-5). Other stressors found were: streams with acid deposition (53% of stream miles); streams with > 5% urban land use upstream (51% of stream miles); streams with non-native aquatic fauna (present in 36% of stream miles); eroded banks (38% of stream miles); and low dissolved oxygen (observed in 12% of stream miles). Several other stressors affected 5% or less of the stream miles in the county. These included channelization and streams without riparian buffers.

Key to MBSS 2000-2004 County Maps



- Tier 1: Stronghold watershed (most robust remaining population) for one or more state-listed fish, aquatic herpetofauna, or freshwater mussels.
- Tier 2: Stronghold watershed for one or more non-state listed species of greatest conservation need (GCN) fish, aquatic herpetofauna, or freshwater mussels, that also had state-listed fish, aquatic herpetofauna, or freshwater mussels present.
- Tier 3: Stronghold watershed for one or more non-state listed GCN fish, aquatic herpetofauna, or freshwater mussels, no state-listed fish, aquatic herpetofauna, or freshwater mussels present.
- Tier 4: Non-stronghold watershed with one or more state-listed fish, aquatic herpetofauna, or freshwater mussels present.
- Tier 5: Not of the above, but a biodiversity conservation watershed. In other words, part of the network of watersheds that must be conserved to keep all native fishes, aquatic herpetofauna, freshwater mussels, and rare, pollution sensitive benthic macroinvertebrates extant in Maryland.
- Tier 6: Not of the above.



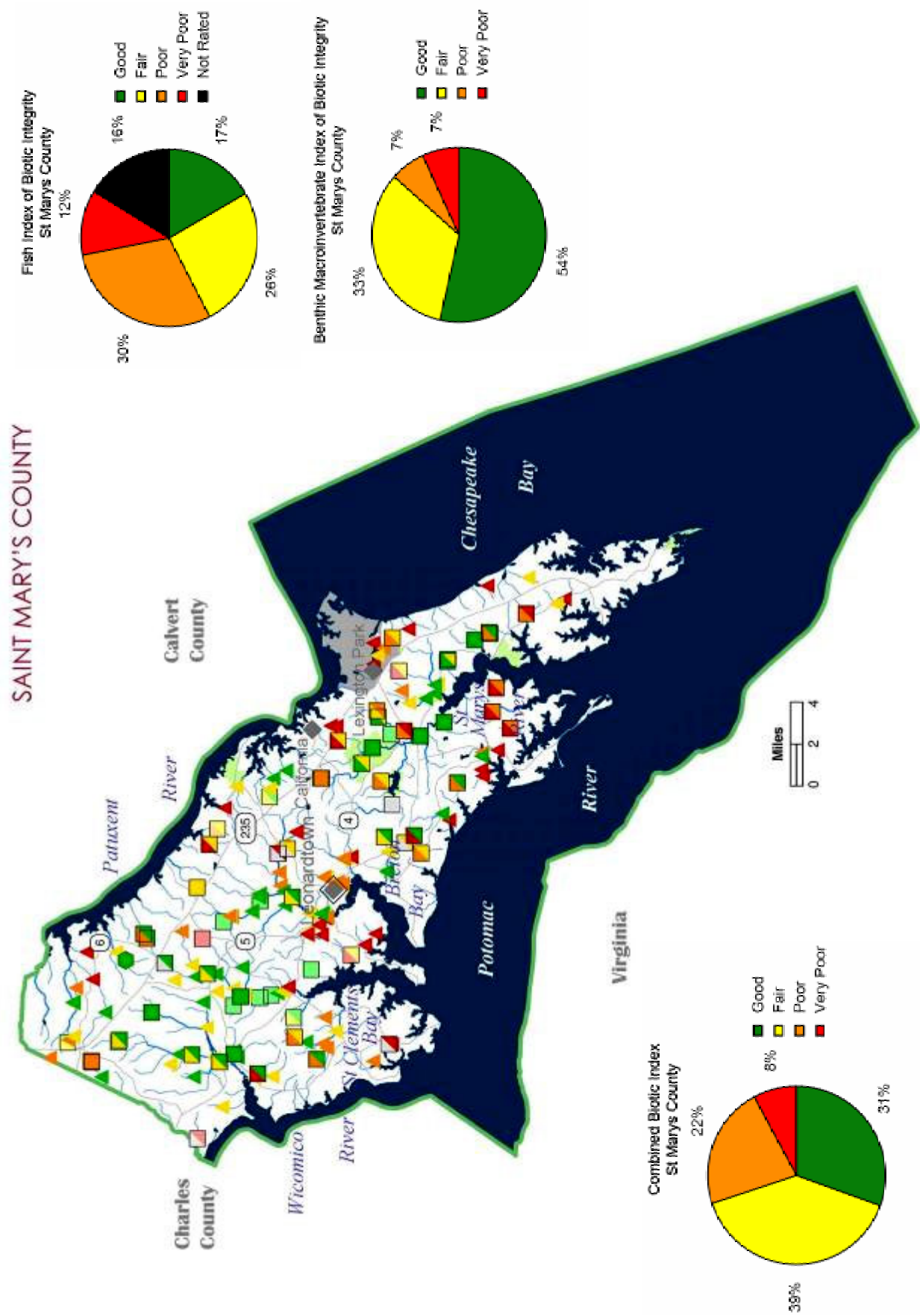


Figure 8-177. Benthic Index of Biotic Integrity (BIBI) and Fish Index of Biotic Integrity (FIBI) pie charts and map of stream health for St. Mary's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie charts represent 2000-2004 data only, Combined Biotic Index pie chart represents mean of FIBI and BIBI)

Table 8-43. MBSS sites sampled in St. Mary's County during 1994- 2004, ranked by Combined Biotic Index Score (CBI)

| St. Mary's County - MBSS Sites | | | | |
|--|--------------------------|-----------------------------|------|--|
| SITE NUMBER | STREAM NAME | WATERSHED | CBI | |
| <i>Best (in order of CBI score)</i> | | | | |
| STMA-JA2-X-2000 | Jarboesville Run | St. Mary's River | 4.67 | |
| STMA-JA1-X-2000 | Jarboesville Run UT1 | St. Mary's River | 4.67 | |
| STMA-JC1-X-2000 | Johns Creek | St. Mary's River | 4.67 | |
| SM-S-237-103-95 | Chaptico Creek | Wicomico River | 4.67 | |
| STMA-113-R-2000 | Saint Mary's River UT3 | St. Mary's River | 4.57 | |
| STMA-104-R-2000 | Warehouse Run | St. Mary's River | 4.55 | |
| WICO-113-R-2004 | Nelsons Run UT | Wicomico River | 4.55 | |
| SM-S-199-302-95 | Saint Clements Creek | St. Clements Bay | 4.52 | |
| SM-S-039-127-95 | Saint Clements Bay UT | St. Clements Bay | 4.52 | |
| SM-S-051-132-95 | Saint Clements Creek UT | St. Clements Bay | 4.52 | |
| STCL-110-R-2002 | Saint Clements Creek UT1 | St. Clements Bay | 4.38 | |
| SM-S-111-112-95 | Jarboesville Run | St. Mary's River | 4.38 | |
| WICO-109-R-2004 | Hayden Run | Wicomico River | 4.38 | |
| SM-S-040-128-95 | Burnt Mill Creek UT | Breton Bay | 4.36 | |
| STMA-306-R-2000 | Saint Mary's River | St. Mary's River | 4.36 | |
| STCL-051-S-2001 | Saint Clements Creek UT1 | St. Clements Bay | 4.33 | |
| STCL-051-S-2004 | Saint Clements Creek UT1 | St. Clements Bay | 4.33 | |
| STMA-HR2-X-2000 | Hilton Run UT1 | St. Mary's River | 4.33 | |
| SM-S-006-212-95 | Burnt Mill Creek | Breton Bay | 4.21 | |
| STMA-208-R-2003 | Johns Creek | St. Mary's River | 4.21 | |
| WICO-207-R-2004 | Chaptico Creek | Wicomico River | 4.19 | |
| WICO-214-R-2004 | Coffee Hill Run | Wicomico River | 4.19 | |
| STCL-106-R-2002 | Saint Clements Creek | St. Clements Bay | 4.14 | |
| STMA-202-R-2000 | Saint Mary's River | St. Mary's River | 4.10 | |
| STMA-104-R-2003 | Martin Cove UT1 | St. Mary's River | 4.07 | |
| <i>Worst (most degraded sites first)</i> | | | | |
| PRLT-115-R-2004 | Whites Neck Creek UT | Potomac River Lower (Tidal) | 1.57 | |
| STMA-116-R-2000 | St. George Creek UT1 | St. Mary's River | 1.57 | |
| STMA-115-R-2003 | St. Mary's River UT5 | St. Mary's River | 1.57 | |
| SM-S-104-126-95 | St. Clements Creek UT | St. Clements Bay | 1.76 | |
| BRET-103-R-2002 | Brooks Run UT1 | Breton Bay | 1.86 | |
| STMA-108-R-2000 | St. Mary's River UT4 | St. Mary's River | 1.86 | |
| SM-S-116-214-95 | Budds Creek | Wicomico River | 1.86 | |
| STMA-101-R-2000 | St. Mary's River UT1 | St. Mary's River | 2.00 | |
| STMA-113-R-2003 | Church Creek UT1 | St. Mary's River | 2.10 | |
| STMA-112-R-2000 | St. Mary's River UT2 | St. Mary's River | 2.10 | |
| SM-S-209-105-95 | Cecil Creek | St. Clement Bay | 2.14 | |
| STMA-USM-X-2000 | St. Mary's River | St. Mary's River | 2.33 | |
| SM-S-007-138-95 | Penbrook Run | St. Mary's River | 2.43 | |
| STMA-112-R-2003 | St. Mary's River | St. Mary's River | 2.55 | |
| PAXL-107-R-2004 | Coles Creek UT | Patuxent River Lower | 2.62 | |
| STCL-116-R-2002 | Dynard Run UT | St. Clements Bay | 2.64 | |
| STMA-HR1-X-2000 | Hilton Run | St. Mary's River | 2.67 | |
| GILB-109-R-2001 | Church Run | Gilbert Swamp | 2.69 | |
| STMA-105-R-2003 | St. Mary's River | St. Mary's River | 2.69 | |
| GILB-114-R-2001 | Church Run | Gilbert Swamp | 2.81 | |
| SM-S-166-143-97 | Coles Creek UT | Patuxent River Lower | 2.81 | |
| STMA-111-R-2000 | Maple Run | St. Mary's River | 2.81 | |
| STMA-106-R-2003 | Jarboesville Run UT1 | St. Mary's River | 2.86 | |
| PRLT-105-R-2002 | Poplar Hill Creek | Potomac River Lower (Tidal) | 2.90 | |
| PRLT-104-R-2002 | Belvedere Creek | Potomac River Lower (Tidal) | 2.93 | |

Table 8-44. Stream Waders sites sampled in St. Mary's County during 2000-2004, ranked by Family-level Benthic Index of Biotic Integrity

| St. Mary's County - Stream Wader Sites | | | | |
|--|--------|--------|--------|-------------|
| WATERSHED | # GOOD | # FAIR | # POOR | # VERY POOR |
| Breton Bay | 14 | 29 | 15 | 14 |
| Gilbert Swamp | 1 | 0 | 1 | 0 |
| Patuxent River Lower | 5 | 8 | 3 | 9 |
| Potomac River Lower (Tidal) | 3 | 1 | 2 | 6 |
| St. Clements Bay | 6 | 7 | 4 | 1 |
| St. Marys River | 10 | 13 | 4 | 8 |
| Wicomico River | 6 | 7 | 0 | 0 |

SAINT MARY'S COUNTY

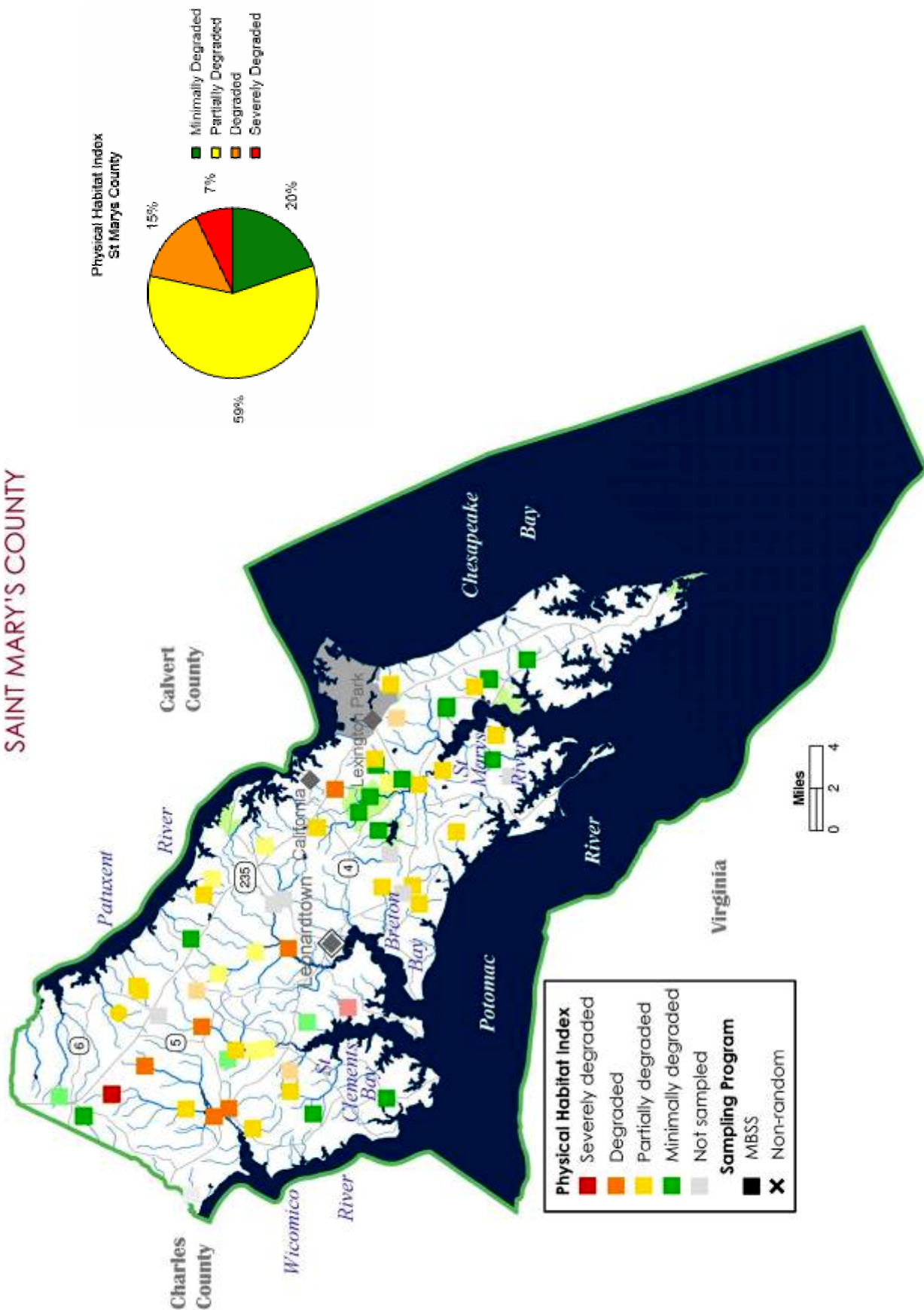


Figure 8-178. Physical Habitat Index (PHI) pie chart and map of stream habitat quality for St. Mary's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

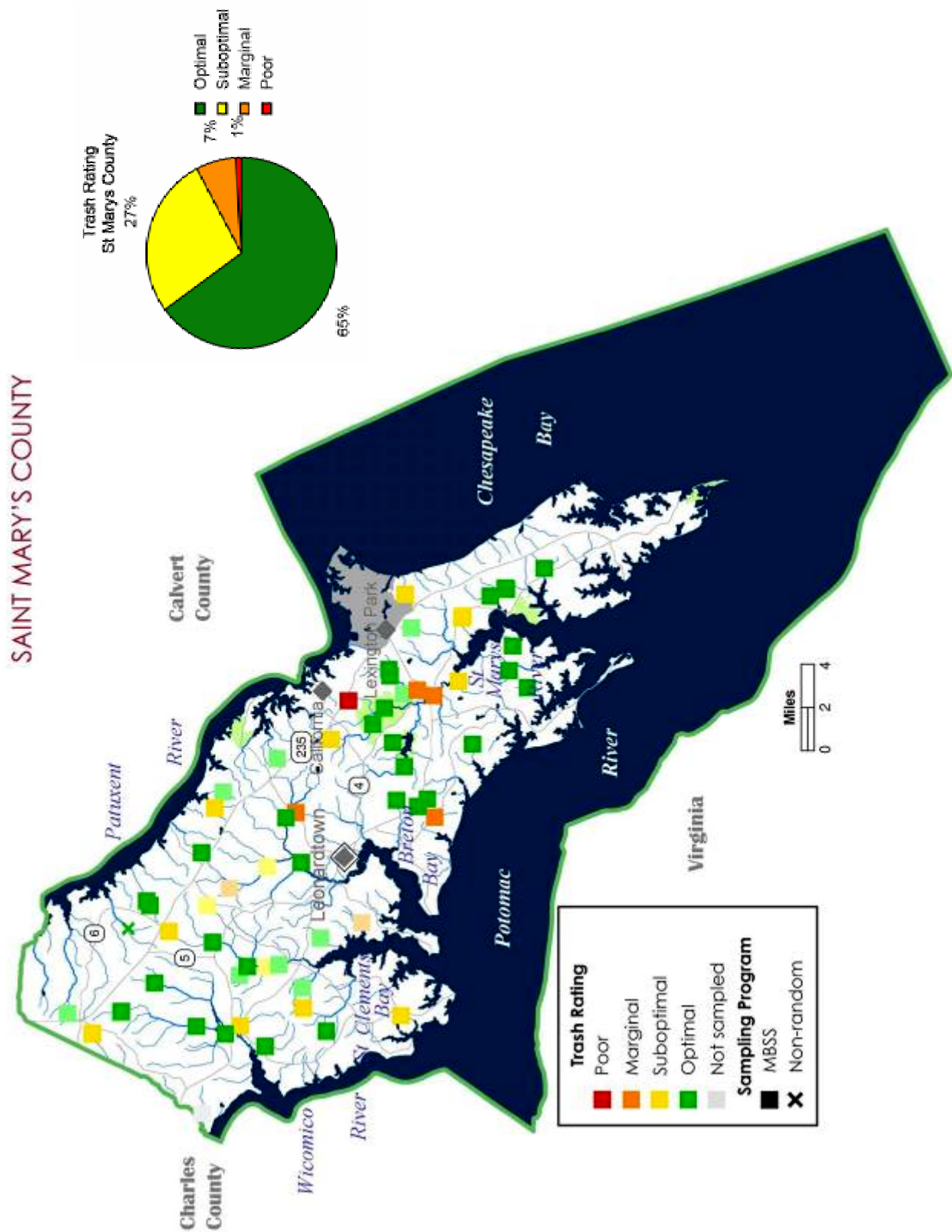


Figure 8-179. Pie chart and map of trash rating (0-20 scale) for St. Mary's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

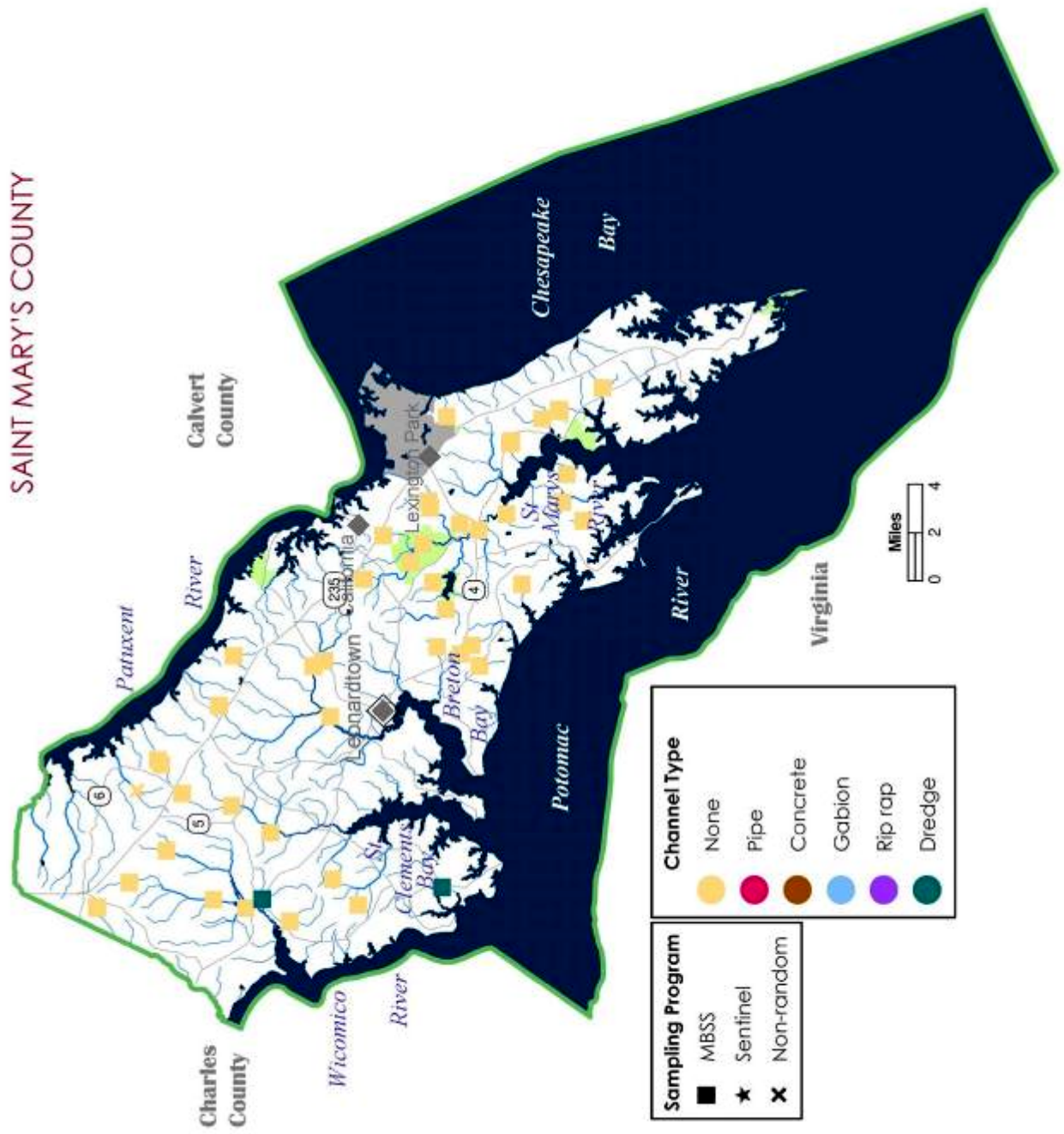


Figure 8-180. Map of channelized sites, by type, for St. Mary's County streams sampled by the MBSS during 2000-2004. *NOTE: When channelization is indicated, it does not necessarily mean that the entire 75m segment was affected.*

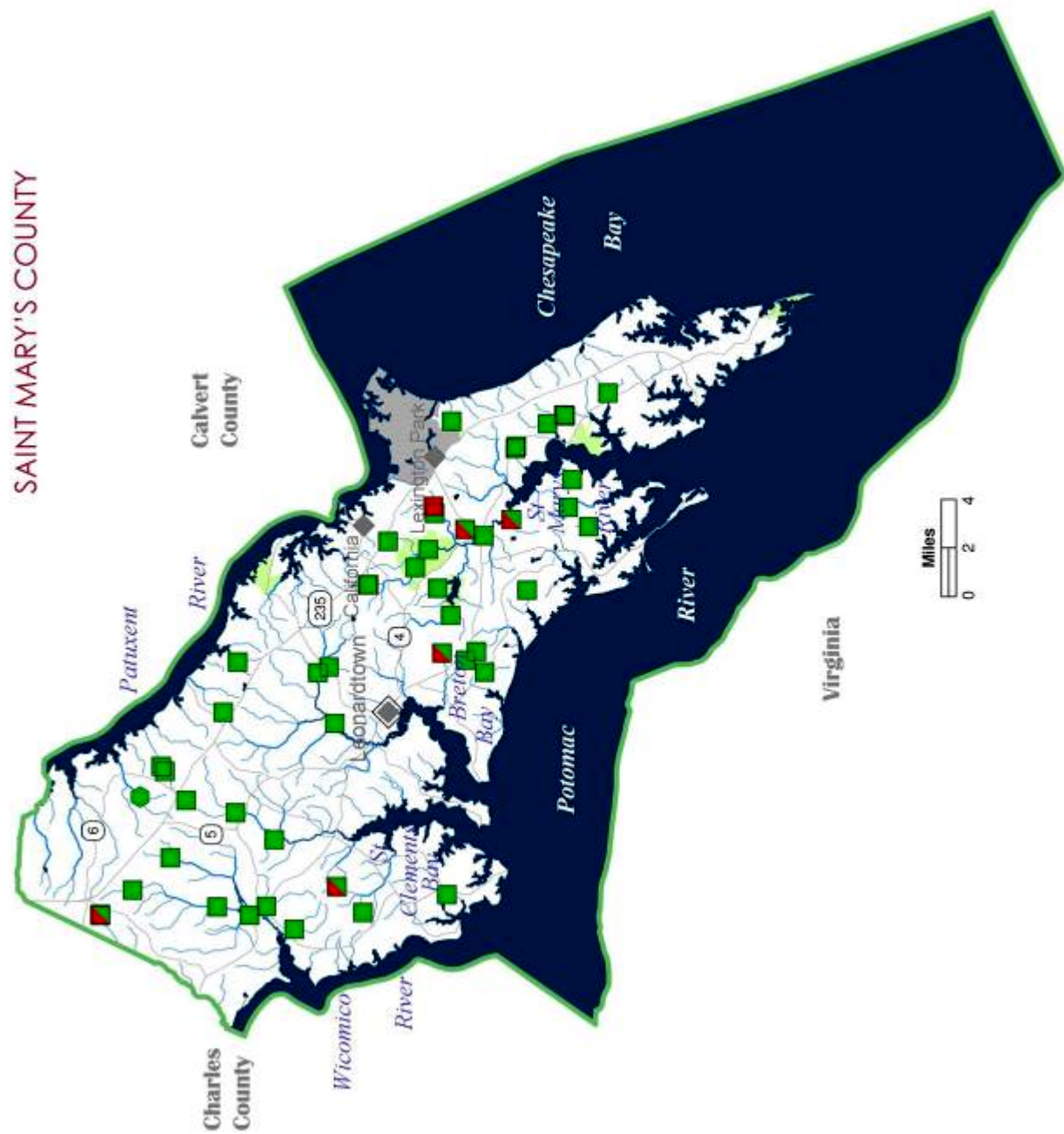


Figure 8-181. Map of sites with inadequate riparian buffers and buffer breaks for St. Mary's County streams sampled by the MBSS during 2000-2004. *NOTE: Multiple riparian buffer breaks sometimes occurred at a site; only the most severe was depicted.*

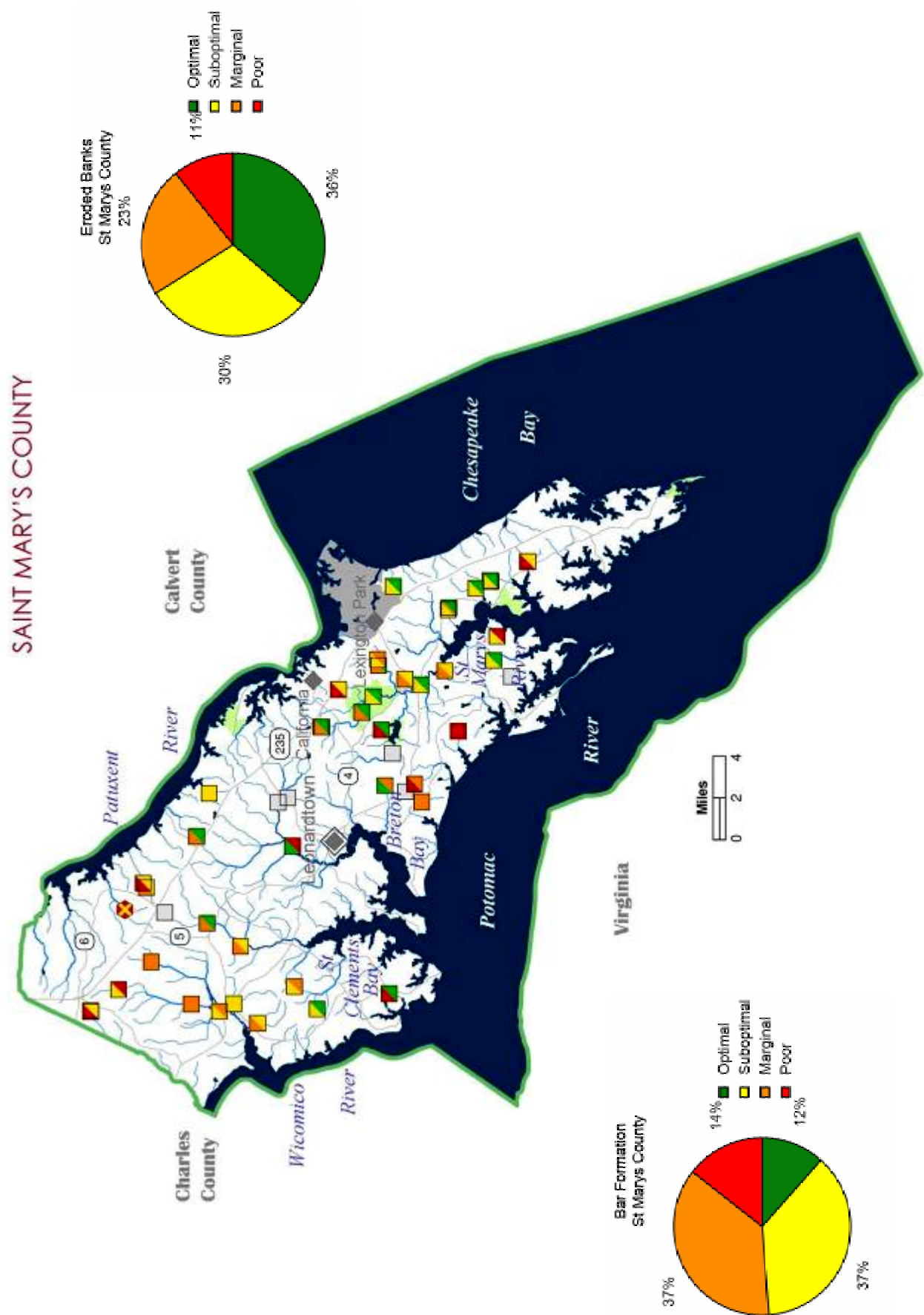


Figure 8-182. Pie charts and map of sites with eroded banks and instream bar formation for St. Mary's County streams sampled by the MBSS during 2000-2004

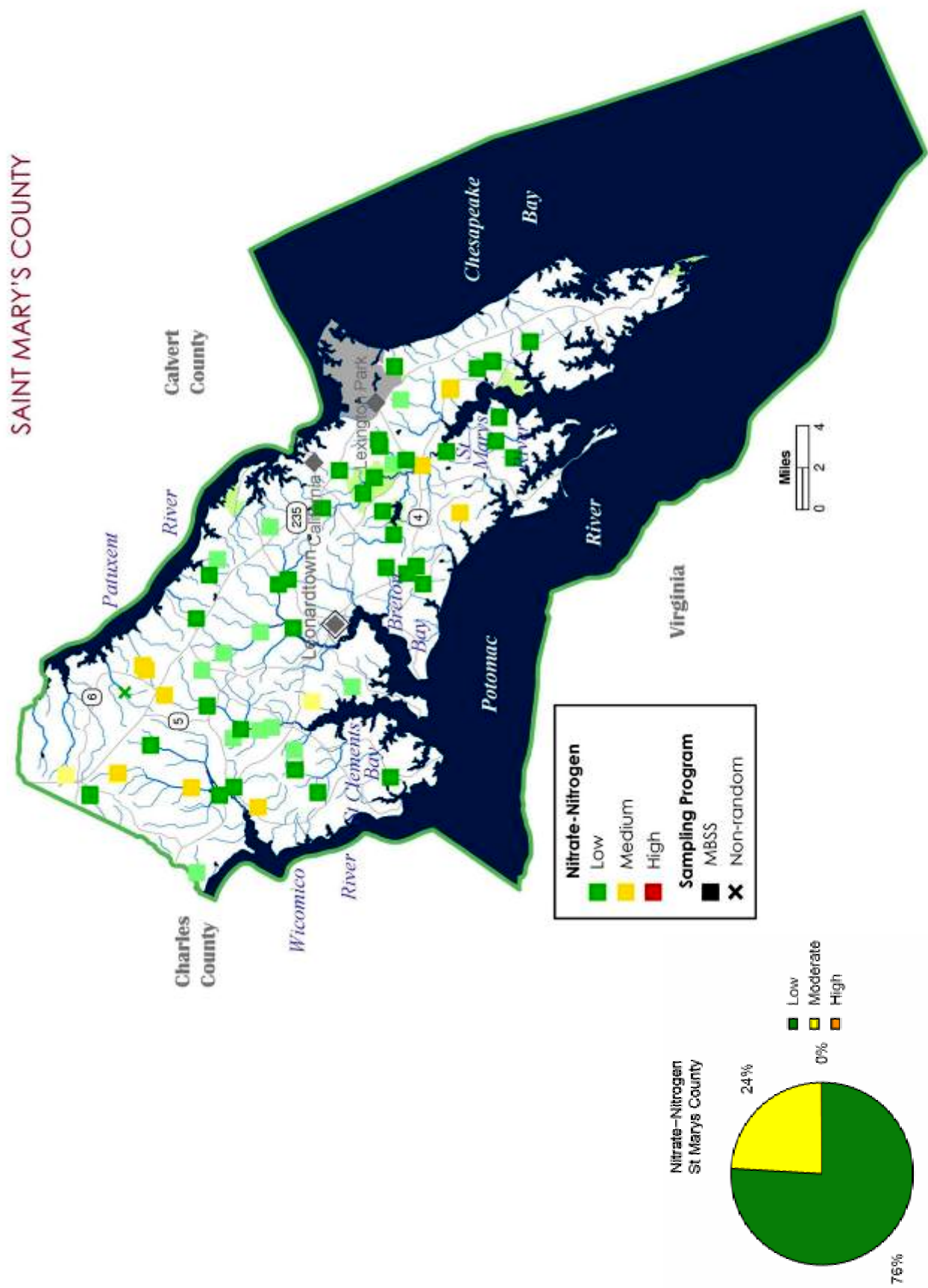


Figure 8-183. Pie chart and map of nitrate-nitrogen values (mg/l) for St. Mary's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only (Low = 1.0, Medium = 1.0 – 5.0, High = > 5.0))

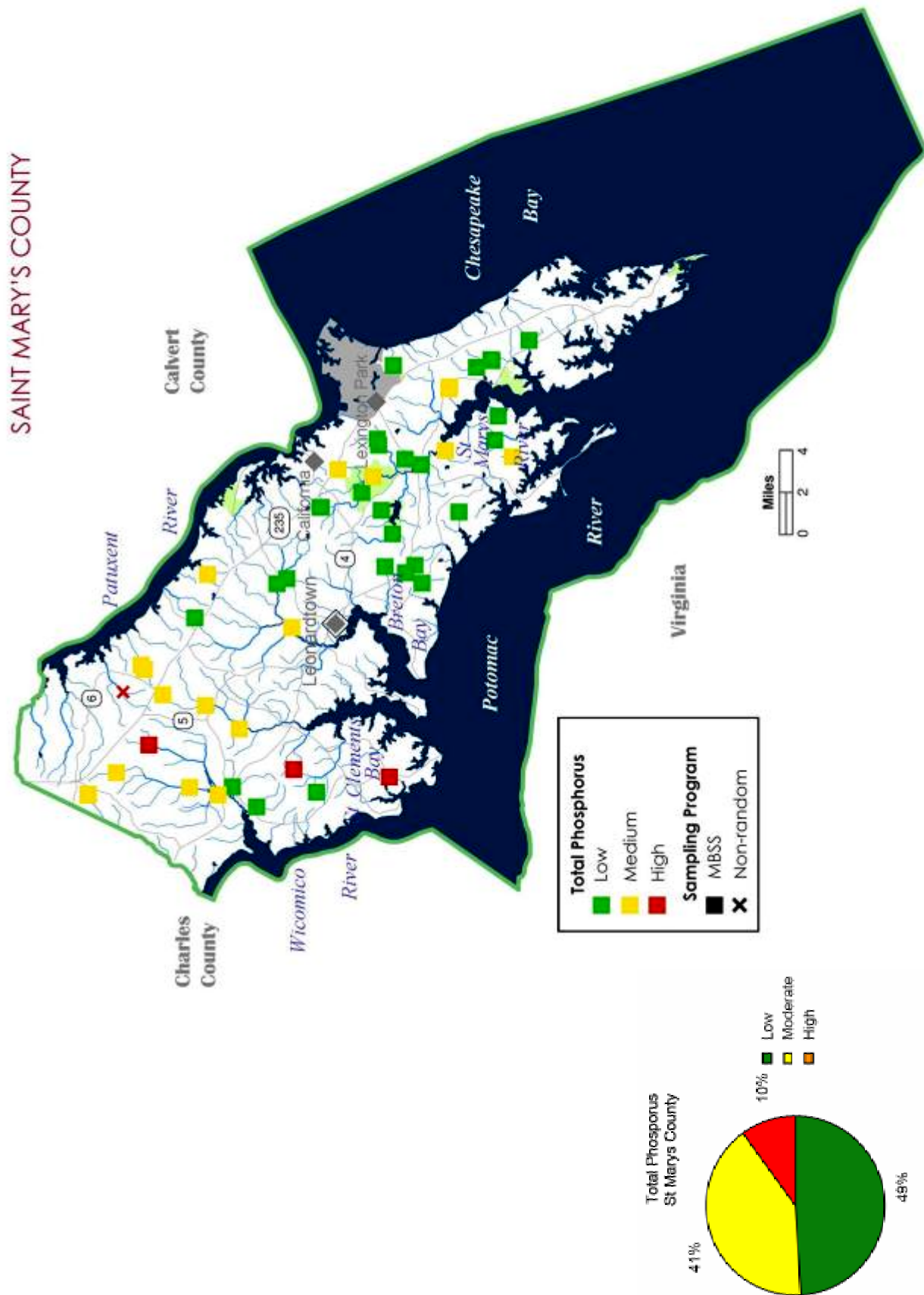


Figure 8-184. Pie chart and map of total phosphorus values (mg/l) for St. Mary's County streams sampled by the MBSS during 2000-2004 (Low = < 0.025, Medium = 0.025 – 0.07, High = > 0.07)

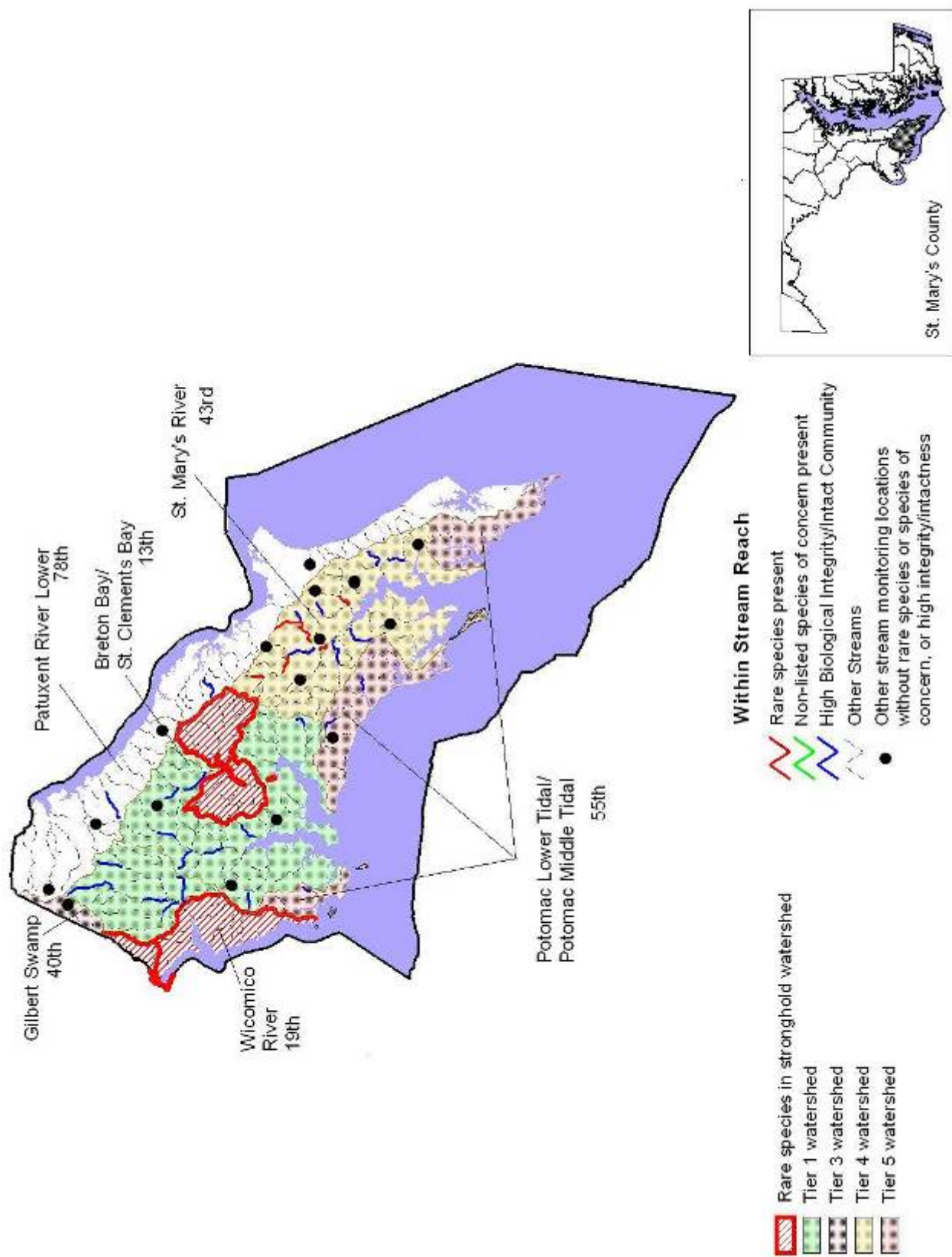


Figure 8-185. Aquatic Heritage Biodiversity Ranking map for St. Mary's County, by watershed. Data from MBSS 1994-2004, MBSS qualitative data, Raesly, unpub. data, Harris 1975, Thompson 1984, and DNR Natural Heritage Program database.

